

We claim:

1. A process for preparing a support for catalysts, which comprises:
 - a) preparing a hydrogel;
 - 5 b) milling the hydrogel to give a finely particulate hydrogel;
 - c) producing a slurry based on the finely particulate hydrogel;
 - d) drying the slurry comprising the finely particulate hydrogel to give the support for catalysts,

wherein a finely particulate hydrogel in which

 - 10 - at least 5% by volume of the particles, based on the total volume of the particles, have a particle size in the range from $> 0 \mu\text{m}$ to $\leq 3 \mu\text{m}$; and/or
 - at least 40% by volume of the particles, based on the total volume of the particles, have a particle size in the range from $> 0 \mu\text{m}$ to $\leq 12 \mu\text{m}$, and/or
 - 15 - at least 75% by volume of the particles, based on the total volume of the particles, have a particle size in the range from $> 0 \mu\text{m}$ to $\leq 35 \mu\text{m}$,

is produced in step b).
2. A process for preparing a support for catalysts as claimed in claim 1, **wherein** a hydrogel in which at least 90% by volume of the hydrogel particles, based on the total volume of the
20 particles, have a particle size in the range from $> 0 \mu\text{m}$ to $\leq 35 \mu\text{m}$ is produced in step b).
3. A process for preparing a support for catalysts as claimed in claim 1 or 2, **wherein** the finely particulate hydrogel produced in step b) has a solids content in the range from $> 0\%$ by weight to $\leq 25\%$ by weight, preferably in the range from 8% by weight to 13% by weight,
25 more preferably in the range from 9% by weight to 12% by weight, calculated as oxide.
4. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** a finely particulate hydrogel in which at least 40% by volume, preferably at least 50% by volume, of the hydrogel particles, based on the total volume of the particles, have
30 a particle size in the range from $> 0 \mu\text{m}$ to $\leq 10 \mu\text{m}$ is produced in step b).
5. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** a finely particulate hydrogel in which at least 10% by volume of the hydrogel particles, based on the total volume of the particles, have a particle size in the range from
35 $> 0 \mu\text{m}$ to $\leq 2.8 \mu\text{m}$, preferably in the range from $> 0 \mu\text{m}$ to $\leq 2.5 \mu\text{m}$, is produced in step b).

6. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** inorganic hydroxides, oxide-hydroxides, oxides and/or salts, preferably selected from the group consisting of SiO_2 , Al_2O_3 , MgO , AlPO_4 , TiO_2 , ZrO_2 , Cr_2O_3 and mixtures thereof, are added to the hydrogel in step b) and/or the slurry in step c).
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7. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** inorganic hydroxides, oxide-hydroxides, oxides and/or salts are added to the hydrogel in step b) and/or the slurry in step c) in an amount of $\leq 10\%$ by weight, preferably $\leq 5\%$ by weight, particularly preferably $\leq 2\%$ by weight, based on the total solids content.
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8. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** AlOOH is added to the hydrogel in step b) and/or the slurry in step c) in an amount of from 1% by weight to 30% by weight, preferably from 5% by weight to 20% by weight, based on the total solids content.
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9. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** compounds of alkaline earth metals, preferably selected from the group consisting of $\text{Ca}(\text{OH})_2$ and $\text{Mg}(\text{OH})_2$, are added to the hydrogel in step b) and/or the slurry in step c) in an amount of from 1% by weight to 10% by weight, particularly preferably from 2% by weight to 4% by weight, based on the total solids content.
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10. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** hydroxyl methyl cellulose is added to the hydrogel in step b) and/or the slurry in step c) in an amount of from 0.1% by weight to 10% by weight, particularly preferably from 1% by weight to 2% by weight, based on the total solids content.
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11. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** the solids content of the slurry is set to $\leq 20\%$ by weight, preferably $\leq 15\%$ by weight, particularly preferably $\leq 10\%$ by weight, very particularly preferably in the range from 8% by weight to 10% by weight, based on the total weight, in step c).
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12. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** drying of the slurry comprising the finely particulate hydrogel is carried out by means of spray drying.
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13. A process for preparing a support for catalysts as claimed in any of the preceding claims, **wherein** $\leq 5\%$ by volume, preferably $\leq 2\%$ by volume, of the support particles obtained after drying have a particle size in the range from $> 0 \text{ }\mu\text{m}$ to $\leq 25 \text{ }\mu\text{m}$, based on the total volume of the particles.

14. A process for preparing a support for catalysts as claimed in any of the preceding claims,
5 **wherein** the support particles produced after drying have a mean particle size in the range
from 1 μm to 350 μm , preferably in the range from 30 μm to 150 μm and particularly
preferably in the range from 40 μm to 100 μm .
15. A support for catalysts which can be prepared as claimed in any of the preceding claims.
16. A support for catalysts as claimed in claim 15, **wherein** the silicon content of the support is
10 $\geq 10\%$ by weight, preferably $\geq 25\%$ by weight, particularly preferably $\geq 30\%$ by weight, very
particularly preferably $\geq 50\%$ by weight, based on the total weight of the support.
17. A support for catalysts as claimed in claim 15 or 16, **wherein** the aluminum content of the
15 support is $\geq 10\%$ by weight, preferably $\geq 25\%$ by weight, particularly preferably $\geq 30\%$ by
weight and very particularly preferably $\geq 50\%$ by weight, based on the total weight of the
support.
18. The use of a support for catalysts as claimed in any of claims 15 to 17 as catalyst.
- 20 19. The use of a support for catalysts as claimed in any of claims 15 to 17 for preparing
supported catalysts for the polymerization and/or copolymerization of olefins.